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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,316	02/12/2004	John F. O'Brien	DP-309920	5519

7590 11/21/2007  
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EXAMINER

BOYER, RANDY

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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11/21/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/777,316	<b>Applicant(s)</b> O'BRIEN ET AL.	
	<b>Examiner</b> Randy Boyer	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Examiner acknowledges Applicant's response filed 27 August 2007 containing amendments to the claims and remarks.
2. Claims 1-4 are pending.
3. Examiner acknowledges that Applicant's amendment to claim 1 is sufficient to overcome the previous objection.
4. The previous rejections of claims 1-4 under 35 U.S.C. 103(a) are maintained. The rejections follow.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pettit (US 2004/0047777) in view of Valensa (US 7069981).

9. With respect to claim 1, Pettit discloses a hydrocarbon fuel to hydrogen reformer of the exothermic type using fuel and oxygen from the ambient air to produce hydrogen reformat and a heat exchanger, comprising a substantially cylindrical reformer (10) having an interior reaction chamber (22) containing a fuel injector (20), an igniter (32), and a catalyst bed (52) within which chamber hydrogen reformat is exothermically formed in reaction with ambient air (see Pettit, page 3, paragraph 34), the reformer also having an ambient air manifold space (26) surrounding the reaction chamber that admits air into the reaction chamber, and a heat exchanger (140) in fluid communication with the reformer, the heat exchanger having reformat passages and ambient air passages arrayed in mutually heat conductive fashion (see Pettit, pages 3-4,

paragraphs 38-39), the reformat flow passages being open at one end to the reaction chamber and open at the opposite end to a reformat exit port from the heat exchanger, the air flow passages being open at one end to the reformer manifold space and open at the opposite end to ambient air, whereby oxygenated ambient air entering the ambient air passages moves in one axial direction, into the reformer manifold space and into the reaction chamber to create hydrogen reformat, the reformat concurrently moving axially in the opposite direction out of the reaction chamber and through the heat exchanger reformat passages, in continuous heat exchanging relationship, with the oppositely flowing ambient air, across the conductive fin over substantially the entire axial length of the heat exchanger, so that the ambient air is continually warmed before reaching the reaction chamber, and the reformat is continually cooled before exiting the heat exchanger (see Pettit, page 4, paragraph 40).

Pettit does not disclose wherein the heat exchanger is substantially cylindrical or substantially coaxial to the reformer and structurally joined therewith.

However, Valensa discloses a heat exchanger that may be integrated for use with an autothermal reformer (see Valensa, Figs. 10 and 1; and column 10, lines 13-17), e.g. the type disclosed by Pettit. Valensa explains that the heat exchanger is composed of a set of coaxial cylindrical walls (see Valensa, column 8, lines 56-63), and may be designed such that it is located relative to the reformer in an integrated unit, with the heat exchanger not surrounding any part of the reformer (see Valensa, column 10, lines 13-17 and 26-31).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to incorporate use of Valensa's heat exchanger design into the reformer of Pettit in order to provide a highly efficient integrated unit.

10. With respect to claim 2, Valensa discloses wherein reformat passages (102) and air passages (104) are formed by concentric, inner and outer tubes between which fins (110) are contained (see Valensa, column 8, lines 56-67).

11. With respect to claim 3, Valensa discloses wherein the manifold space has an outer wall integral with the heat exchanger outer wall (see Valensa, Fig. 10).

12. With respect to claim 4, Valensa discloses wherein the heat exchanger is abutted with a generally cylindrical and coaxial heat exchanger of similar construction having an inner wall integral with the inner wall (see Valensa, Fig. 10).

### ***Response to Arguments***

13. Applicant's arguments filed 27 August 2007 have been fully considered but they are not persuasive.

14. Examiner understands Applicant's principal argument to be:

Valensa teaches away from Applicant's  
combined reformer / integrated heat exchanger  
which employs pure counterflow.

15. In response to Applicant's argument, Examiner notes Fig. 10 of Valensa, which illustrates wherein air enters at an inlet connection (130) and flows in a direction from right to left until entering the auto-thermal reformer (ATR, 26) wherein reformat is produced and exits the device at outlet connection (132) (see Valensa, Fig. 10 (showing

reformat flow substantially from left to right)). Thus, it reasonably appears from Valensa's Fig. 10 and the accompanying text that air entering the air passage moves in one axial direction while reformat produced in the ATR moves axially in substantially the opposite direction in a continuous heat exchange relationship.

### ***Conclusion***

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 10:00 A.M. to 7:00 P.M. (EST).


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB



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